



PROPOSED PLAN

North Bronson Industrial Area Superfund Site

August 1997

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INTRODUCTION

This **Proposed Plan** presents the preferred remedy for the North Bronson Industrial Area Superfund site (the site). This plan was developed by the Michigan Department of Environmental Quality (MDEQ) and the United States Environmental Protection Agency (EPA). This proposed plan, would protect human health and the environment by consolidating waste from several source locations into one pre-existing repository (the western lagoons), eliminating direct contact hazards, and treating groundwater impacted by waste material deposited into the repository. (Note: Words highlighted in bold print are defined in the attached glossary.)

This remedy is based on the results of the **Remedial Investigation (RI)** and **Feasibility Study (FS)** conducted by the MDEQ with funding from the EPA. The RI collected and analyzed information to determine the nature and extent of contamination present at the site. The FS identified and evaluated the most appropriate technologies for addressing contamination problems at the site. The MDEQ completed the RI in July 1993 and

the FS in May 1995. The FS was later revised to reflect changes in Michigan's clean-up law and to incorporate a new technology that was not reviewed in the original FS. The revision (FS addendum) was completed in July 1997.

Public input on the alternatives for addressing contamination problems at the site and the information that supports these alternatives is an important contribution to the remedy selection process. Based on public comment or new information, the MDEQ and the EPA may elect to adopt the preferred plan as originally proposed, modify a component of the preferred plan, or select a different alternative. Therefore, members of the Bronson community and any interested parties are strongly encouraged to review and comment on the RI and all of the technologies and alternatives considered in the FS for the cleanup of this site.

All of this information is available for review in the North Bronson Superfund site Public Repository. The repository is located at the Bronson Public Library. For the location of the library and other sources of information, please see "Available Information" on page ***.

The public comment period begins August 1, 1997 and ends on August 30, 1997. The MDEQ and the EPA will also hold a public meeting at 7:00 p.m. in the Bronson Theater on August 13, 1997. The purpose of this meeting is to further explain the proposed plan and to accept any oral or written comments offered by the public during the meeting.

After the public comment period ends, the MDEQ will summarize and respond to all public comments in a document called the **Responsiveness Summary**. The MDEQ and the EPA will then select the final remedy and sign the **Record of Decision (ROD)** for the site.

SITE BACKGROUND

The North Bronson Industrial Area Superfund site is a two hundred-acre parcel located in the city of Bronson, Branch County, Michigan (Figure 1). The site is bordered to the east by Lincoln Street, to the south by Filmore and Union Streets, to the west by Burr Oak Street, and to the north by County Drain #30 (CD #30). The predominant features of the site are two sets of seepage lagoons (Eastern and Western) located in the northeast and northwest sections of the site, next to CD #30 (see map).

This proposed plan addresses those areas adversely impacted by the disposal of hazardous waste into the

seepage lagoons. The impacted areas are the eastern and western lagoons, and CD #30. The media or source material addressed by this plan include lagoon soil, sludge, and sediment; groundwater impacted by waste seeping from the lagoons, and CD #30 surface water and sediment.

The eastern and western lagoons were built in 1938 and 1949 respectively, to contain metal-laden plating and other industrial waste generated by several industries in the area. An industrial sewer system was used to transport waste from industrial facilities to the lagoons. Between 1938 and 1970, the city of Bronson owned and operated both sets of lagoons. The Bronson Plating Company purchased the Eastern lagoons from the city in 1970. The Western lagoons, which the city owns today, were used until 1980. Bronson Plating continued to discharge to the Eastern lagoons until 1981. Other businesses that used the lagoons and industrial sewer include, but are not limited to, Scott Fetzer and L.A. Darling.

The contaminants detected at the site are **chlorinated organic compounds (TCE, 1,2-DCE, and vinyl chloride)**, metals (arsenic, antimony, barium, cadmium, chromium, copper, nickel, and zinc), **nitrate-nitrite** and **cyanide**. The lagoons are the main source of metals and cyanide at the site. The main source of chlorinated organic compounds appears to be soils beneath the Scott Fetzer and L.A. Darling properties. The original source of this contamination appears to be the industrial sewer which probably leaked contaminants into the underlying soil and groundwater. At this time, the MDEQ is investigating the industrial sewer as a source area. If the sewer does prove to be a source of contamination at the site, the MDEQ and the EPA will address this problem at a later date.

The groundwater flows northwest across the site through the source areas picking up contaminants that seep from contaminated soil and sludge. Groundwater contaminated with a mixture of chlorinated organic compounds, metals, and cyanide discharges to CD #30. CD #30 is an open drain that eventually empties into Swan Creek. The discharge of contaminated groundwater to CD #30 has degraded the sediment and surface water quality of the drain and potentially Swan Creek.

Contaminant releases from soils, sludge, and groundwater are expected to continue at the site until remedial actions at the source areas are undertaken.

SUMMARY OF SITE RISKS

The Western Lagoons - There are 5 western lagoons ranging in size from approximately 1,360 square feet to 19,700 square feet. The lagoons are surrounded by berms approximately 4 to 5 feet in height. Most of the western lagoons contain standing water throughout the year.

Heavy metals, chlorinated organic compounds, cyanide, nitrate-nitrite, and semi-volatile organic compounds were detected in the surrounding berms, surface and subsurface soil, and lagoon sludge or sediment. Contaminants were detected at levels that present a risk to human health and the environment. Contaminated sludge and soil are also releasing contaminants to the groundwater.

The western lagoon area is zoned for industrial use only. Based on the state's cleanup standards for industrial property the amount of soil or sludge contaminated with metals, chlorinated organic compounds, or semi-volatile organic compounds that must be addressed covers a 178,000 square foot area to a depth of at least 20 feet or 132,000 cubic yards.

The Eastern Lagoons - The Eastern lagoons were constructed in 1949. Originally there were five lagoons. However, after reportedly removing the sludge and backfilling some of the lagoons, the Bronson Plating Company constructed a building over approximately two and one-half of these lagoons. Today, only remnants of three eastern lagoons are visible. The eastern lagoons do not contain standing water.

Heavy metals, chlorinated organic compounds, cyanide and semi-volatile organic compounds were detected in lagoon sludge and soil. Contaminants were detected at levels that present a risk to human health and the environment. Contaminated sludge and soil are also releasing contaminants to the groundwater.

Lagoon sludge was detected in samples taken at depth (8.5 ft) next to the Bronson Plating building. This indicates that sludge material from the former lagoons may still be present beneath the building. The building however, effectively prevents direct contact with any residual sludge and by covering a potential source area, the building reduces the infiltration of rainwater which reduces the migration of contaminants.

The eastern lagoon area is zoned for industrial use only. Based on the state's cleanup standards for industrial property the amount of soil or sludge contaminated with metals, chlorinated organic compounds, or semi-volatile organic compounds that must be addressed covers a 26,000 square foot area to a depth of around 10 feet or 26,000 cubic yards.

County Drain #30 - County Drain #30, which forms the northern border of the site, is a natural waterway protected by the state. CD #30 originates in a small wetland about one half mile northeast of the site and empties into Swan Creek about 1.5 miles west of the site. All surface drainage and groundwater within the North Bronson Industrial Area discharges to this county drain.

Site related contaminants detected in the CD #30 sediment or surface water consist of chlorinated organic compounds, semivolatile organic carbons, and metals. Polychlorinated biphenyls (PCBs) were also found in sediment downstream of the site, but could not be linked to site-related activities. Because PCBs are present, their potential impact on the selection of a remedy has to be considered. For example, materials with PCBs at concentrations above 50 parts per million have to be disposed of in specially regulated landfills.

CD #30 must meet the MDEQ's residential cleanup standards and be protective of the environment. Based on these standards, the amount of sediment that must be addressed is estimated at 2,760 cubic yards.

Groundwater - The upper water-bearing layer or **aquifer** beneath the entire industrial area is contaminated with chlorinated organic compounds and, to a lesser extent, metals at levels above federal and state drinking water quality standards. The groundwater directly beneath the lagoons is contaminated with chlorinated organic compounds, metals and cyanide. Groundwater, which discharges to CD #30, is contaminated at concentrations above MDEQ standards for the protection of surface water bodies.

Drinking Water Wells - Drinking water wells located within an area bounded by State Street to the south, N. Matteson to the east, Mill Street to the west, and County Drain #30 to the north are contaminated with chlorinated organic compounds.

Except for the residential well at (b) (6), all drinking water wells within this area have been abandoned. All affected homes or businesses except for the home at (b) (6) are connected to the Bronson municipal water supply system. Chlorinated organic compounds were detected at (b) (6) but at concentrations below state and federal drinking water standards. However, because the concentration of contaminants in this well is expected to increase over time, the state will abandon this well and connect the house to the municipal water supply system.

HUMAN HEALTH AND ENVIRONMENTAL RISK ASSESSMENT

The MDEQ conducted a Human Health and Environmental Risk Assessment to determine whether

contaminants detected at the site may affect human health or the environment. The assessment compared contaminant levels found at the site to state and federal standards or guidelines; considered how people, animals, or plants could be exposed to the contamination; and evaluated whether these contaminants posed a threat to human health or the environment.

Human Health - Human health risks are quantified by calculating the non-cancer and the cancer risk factors for each chemical detected at the site. For non-cancer risks, the contaminant concentration detected on site must not exceed a reference dose concentration for that chemical. Numerically this comparison is expressed as the **hazard quotient (HQ)** for the chemical or for multiple contaminants the **hazard index (HI)**. The HQ or HI cannot be greater than 1.00.

The acceptable risk range for cancer causing chemicals established by the EPA is no more than one additional case of cancer for every 10,000 (1×10^{-4}) to 1,000,000 (1×10^{-6}) people exposed. The MDEQ manages cancer risk to no more than one additional case of cancer for every 100,000 (1×10^{-5}) people exposed to a chemical.

Western Lagoon Area

Risks were estimated for trespassers exposed to contaminants detected within the western lagoon area. Trespassers were assumed to be exposed to contaminated sludge, surface water, and air. Under these conditions, the western lagoon area presents both a noncarcinogenic and a carcinogenic health hazard. The majority of the non-cancer risk ($HI=6$) is from skin contact with cadmium, and chromium contaminated sludge. The majority of the cancer risk ($CR=5 \times 10^{-6}$) is from the ingestion of arsenic in surface water and sludge.

Eastern Lagoon Area

Risks were estimated for trespassers exposed to contaminants detected within the eastern lagoon area. Trespassers were assumed to be exposed to contaminated surface soil. Under these conditions the eastern lagoon area appears to pose a non-cancer health concern. The majority of the non-cancer risk ($HI=20$) is from direct contact with the skin and the incidental ingestion of antimony, chromium, and nickel.

County Drain #30 (CD #30)

Risks were quantified for children playing in CD #30 and residents living near CD #30. Children who wade in CD #30 are assumed to be exposed to contaminated surface water, sediment and organic vapors in the air.

Residents are potentially exposed to organic vapors in the air. Under these conditions there is a cancer risk to children exposed to sediment. The majority of cancer risk ($CR=1 \times 10^{-5}$) is associated with children ingesting sediment contaminated with arsenic. There is also a cancer risk to residents exposed to volatile chlorinated organics. The majority of cancer risk ($CR=2 \times 10^{-5}$) is associated with residents inhaling vinyl chloride.

Area-wide Groundwater

The most concentrated portion of the chlorinated organic plume lies below the former Scott Fetzer and L.A. Darling properties. The organic plume generally decreases in concentration as it flows west and north toward CD #30. Risks were quantified for residents assuming that they will use the contaminated shallow groundwater in the future. Health risks were developed separately for groundwater consumption and for exposure to groundwater contaminants through skin contact and inhalation while showering. Based on the concentration of contaminants in the groundwater, residential use would pose a non-cancer ($HI=60$) and cancer ($CR=2 \times 10^{-4}$) risk to future residents. The non-cancer risk was associated with ingestion of 1,2-dichloroethene. The majority of the cancer risk is associated with the ingestion of vinyl chloride in the groundwater.

Lagoon Area Groundwater

The baseline risk assessment did not characterize risk specifically associated with groundwater impacted by the lagoons. However, health risks associated with exposure to lagoon area groundwater would be essentially the same as those estimated for exposures to the area-wide groundwater contamination. The contaminants detected in both groundwater beneath the lagoon and the groundwater beneath the entire industrial area are the same. Therefore, the risks from exposure to groundwater should be the same regardless of the source. The majority of the health risks comes from exposure to chlorinated organic compounds.

Ecological Concerns - The MDEQ evaluated ecological risks to County Drain #30 by comparing the concentrations of site-related contaminants in CD #30 surface water and sediment and groundwater venting to CD #30 to EPA and MDEQ criteria or guidance documents if agency standards were not available.

Impacts to CD #30 surface water were evaluated against EPA Ambient Water Quality Criteria (AWQC) and MDEQ Groundwater Surface Water Interface (GSI) criteria. Several metals were detected in CD #30 surface water or in groundwater discharging to the drain at levels above AWQC or MDEQ GSI values. Metals detected at concentrations that exceed GSI or AWQC values are cadmium, copper, lead, selenium, cyanide, and chromium IV.

Impacts to CD #30 sediment were evaluated by comparing contaminant concentrations found in CD #30 to sediment guidance documents or background conditions. The guidance documents used for this comparison were the Ontario Ministry of the Environment, Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, and the NOAA Technical Memorandum NOS ONA 52, The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. Sediment background levels were used if they were higher than the lowest impact level established by either guidance, but did not exceed the severe impact level quantified in the Ontario guidelines. Metals detected at concentrations that exceed sediment guidance values are antimony, arsenic, barium, cadmium, chromium IV, copper, lead, manganese, mercury, nickel, silver, zinc and cyanide.

Risk Assessment Summary - The risk assessment conducted as part of the RI indicates the site presents an unacceptable risk to current residents, trespassers and the environment. Therefore, under the Comprehensive Environmental Response, Compensation, and Liability Act (1980 PA 96-510) (**CERCLA**), the agencies must take action to reduce this risk to acceptable levels.

THE ALTERNATIVES

Remedial Objectives - Based on the results of the RI, the MDEQ conducted a FS to identify, develop, and evaluate appropriate alternatives for reducing risks to human health and the environment. To be considered, an alternative had to meet two basic clean-up objectives identified for the site.

1. Eliminate direct contact concerns for both human and animal receptors, and
2. Prevent releases of contaminants above criteria beyond site boundaries and into CD #30.

To meet these objectives, the alternatives had to meet the chemical-specific requirements for eastern and western lagoon sludge and soils, groundwater, and County Drain #30 sediment, or eliminate pathways of exposure. The chemical-specific cleanup goals for the alternatives evaluated are presented in Tables 1 through 3.

Description of the Alternatives - The MDEQ developed clean-up alternatives for each area of concern. These areas are the Eastern Lagoons (EL), and Eastern Lagoon Groundwater (ELG), the Western Lagoons (WL) and Western Lagoon Groundwater (WLG), and County Drain #30 (CD). The alternatives developed for each area are described below. A comparative analysis of the alternatives is provided in Tables 4 through 6. The costs

presented for each alternative include capital costs (equipment, labor, and other construction expenses), operation and maintenance (O&M) expenses (i.e. groundwater monitoring or maintaining a cap), and total present worth. The total present worth is the money that needs to be set aside now, at the prevailing interest rate, to pay for all capital and future costs. The present worth estimate assumes a 30 year project life.

To address each area of concern, the preferred plan presented below uses a combination of several alternatives or elements of the alternatives developed for the site. Alternatives only partially used are identified with an asterisk. For example, excavation without treatment (EL-4*) is used in the preferred plan. Excavation without treatment is acceptable where the excavated material is going to be consolidated and capped on-site. Cost associated with each alternative or an element of an alternative used in the preferred plan only includes the capital cost for that alternative or element. Engineering, present worth and O&M costs are applied to the overall plan.

Common Elements

All the Alternatives, with the exception of WL-4 and EL-4, considered for the site have a number of common elements. These elements are:

- I. Institutional Controls/Access Restrictions - This generally refers to perimeter fencing, warning signs, permanent markers, and deed restrictions on the property to control future site development or the use of impacted resources like groundwater.
- I. Further Characterization - Further characterization of impacted areas may be required to further refine the horizontal and vertical extent of soil, sludge, and groundwater contamination in the source areas.
 - a)
- II. Groundwater monitoring - Groundwater monitoring will be required to confirm the effectiveness of the selected remedy.
 - a)
- III. Five year reviews

For alternatives WL-4 and EL-4 contaminated soil and sludge would be removed from the site, treated and disposed of properly. Removal of contaminated waste would eliminate the threat to groundwater. By removing the source of contamination, contaminated groundwater would have an opportunity to clean itself up naturally. Additionally removal of the waste from the area would allow for the unrestricted use of the entire

North Bronson area. There would be no need for institutional controls, long-term monitoring or five year reviews. Unfortunately, these alternatives were, at \$52,000,000 and \$10,500,000 respectively, the most costly alternatives evaluated.

No Action Alternatives (WL-1, WLG-1, EL-1, ELG-1 and CD-1):

The Superfund program requires that a “no action” option be considered at every site. Under a no action remedy the site would remain as it is today. This option is used as the benchmark for comparing and evaluating the effectiveness of all other alternatives.

The costs associated with a no action alternative are those related to the 5-year reviews and groundwater monitoring. Thirty year present worth estimates are \$10,000 for reviews and \$500,000 for groundwater monitoring. However, a no action remedy does not meet the cleanup objectives for the site, and would allow a continued unacceptable risk to human health and the environment.

Western Lagoon Area

Alternative WL-2: Area Cap

WL-2 requires constructing a cap over the Western Lagoon area. The purpose of the cap is to cover the waste to prevent exposures, and to stop rainwater from infiltrating and **leaching** contaminants into the groundwater. The cap however, will not prevent the leaching of contaminants into the groundwater from waste deposited below the water table.

Alternative WL-3: Soil Fixation

The intent of soil fixation is to slow the release of contaminants into the environment. This process involves a deep soil mixing technique that directly applies stabilizing agents to the soils. These agents are designed to reduce the mobility of the contaminants. An area cap would also be required to prevent exposures and to reduce the infiltration of rainwater.

Alternative WL-4: Excavation With Treatment

The intent of excavation with treatment is to prevent exposure and the release of western lagoon contaminants to the environment by removing, treating, and properly disposing contaminated sludge and soil.

Western Lagoon Area Groundwater

Alternative WLG-2: Groundwater Pumping.

The intent of groundwater pumping is to capture and treat contaminated groundwater before it migrates from the site. This prevents the movement of contaminants into the surrounding environment. Treated groundwater would be discharged to CD #30.

*Alternative WLG-3: Containment By **Slurry Wall** And Groundwater Pumping.*

The intent of this alternative is to prevent the movement of contaminants via the groundwater by surrounding the lagoons with a subsurface wall. The wall would create a cell isolating the contaminants from the environment. Groundwater seeping into the cell would be pumped out and treated before discharging it to CD #30. This alternative would not prevent groundwater contaminated by sources upgradient from the lagoons from moving around the cell and discharging to CD #30.

Eastern Lagoon Area

Alternative EL-2: Area Cap

EL-2 requires the construction of a cap over the Eastern Lagoon area. The purpose of the area cap is to prevent exposure to Eastern Lagoon contaminants and to slow the leaching of contaminants into the groundwater by preventing the infiltration of rainwater. The cap however, will not prevent the leaching of contaminants into the groundwater from waste that is below the water table.

Alternative EL-3: Soil Fixation

The intent of soil fixation is to slow the movement of contaminants into the groundwater. This process involves a deep soil mixing technique that directly applies stabilizing agents to the soils. These agents are designed to reduce the mobility of the contaminants. An area cap would also be required to prevent exposures and to reduce the infiltration of rainwater.

Alternative EL-4: Excavation and Treatment

The intent of excavation and treatment is to prevent direct contact exposure and the movement of contaminants into the surrounding environment by removing, treating, and properly disposing contaminated sludge and soil.

Eastern Lagoon Groundwater (ELG)

Alternative ELG-2: Groundwater Pumping

The intent of groundwater pumping is to capture and treat contaminated groundwater before it migrates from the site. This prevents the movement of contaminants into the surrounding environment. Treated groundwater

would be discharged to CD #30.

Alternative ELG-3: Containment Wall and Groundwater Pumping

The intent of this alternative is to isolate the contaminants beneath the Bronson Plating Company building by surrounding the facility with a subsurface containment wall. Groundwater would be pumped from within the contained area and treated prior to discharge to CD #30.

Alternative ELG-4: Containment Wall, Slurry Wall, and Groundwater Pumping

The intent of this alternative is to isolate the contaminants beneath the Bronson Plating Company building with a containment wall and to build a slurry wall around the remaining lagoons. Groundwater would be pumped from within the containment and slurry walls and treated to remove contaminants prior to discharge to CD #30.

County Drain #30 (CD)

Alternative CD-2: Access Restrictions and Monitoring

The intent of access restrictions and monitoring is to prevent exposure to contaminants in CD #30 by institutionally controlling access to the drain.

Alternative CD-3: Partial Sediment Dredging and Treatment

The intent of partial sediment dredging is to reduce exposure to contaminants and the movement of contaminants into the surrounding environment by removing and treating contaminated sediments from the drain near the lagoon areas.

Alternative CD-4: Full Sediment Dredging and Treatment

The intent of full sediment dredging and treatment is to prevent exposure and the movement of contaminants into the surrounding environment by removing and treating contaminated sediment from the entire length of CD #30.

a)

Alternative CD-5: Sediment Dredging with Channeling

This alternative would only redirect the path of groundwater and would spread the contamination downstream. This alternative has been eliminated as a possible option.

Alternative CD-6: Full Sediment Dredging/French Drain Along Selected Areas

The intent of this alternative is to prevent exposure to contaminated sediment and prevent the movement of contaminated groundwater into CD #30. To accomplish the goals of this alternative the entire length of the

drain would be dredged. Also, contaminated groundwater emanating from the lagoon areas would be intercepted by the french drain and treated before it could enter CD #30 and re-contaminate that portion of the county drain.

Alternative CD-7: Full Sediment Dredging and Full French Drain

The intent of this alternative is to prevent exposure to contaminated sediment and the movement of contaminated groundwater into the environment. To accomplish the goals of this alternative the entire length of the drain would be dredged. Also contaminated groundwater along the entire length of the drain would be intercepted by the french drain before it could enter CD #30 and re-contaminate the drain.

EVALUATION OF THE PREFERRED ALTERNATIVE

In selecting a preferred remedy, the MDEQ uses nine criteria required by CERCLA to evaluate the alternatives developed in the FS. Seven of the criteria are used to evaluate and compare the alternatives on protection, cost, and engineering feasibility issues. The last two criteria, EPA acceptance and community acceptance, are completed after reviewing comments received during the public comment period. The nine criteria are as follows:

1. **Overall protection of human health and the environment** Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled with treatment, engineering controls, or institutional controls.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** (ARARs or federal and state laws). Compliance with ARARs addresses whether a remedy will meet all of the ARARs of other state and federal environmental laws or justifies invoking a waiver.
3. **Long-term effectiveness and permanence** Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time after it has been implemented.
4. **Reduction of contaminant toxicity, mobility, and volume** Reduction of toxicity, mobility, and volume addresses the anticipated performance of the treatment technologies that may be employed in a remedy.

5. **Short-term effectiveness** Short-term effectiveness refers to the speed with which the remedy achieves protection, and any adverse impacts on human health and the environment that may result during the construction and implementation period.

6. **Implementability** Implementability is the technical and administrative feasibility of a remedy, including the availability of material and services needed to implement the chosen solution.

7. **Cost** The benefits of implementing a particular alternative are weighed against the cost of implementation.

8. **State acceptance** EPA acceptance indicates whether the EPA, based on its review of the Proposed Plan and comparison with federal laws, concurs with, opposes, or has no comment on the preferred alternative.

9. **Community acceptance** Community acceptance summarizes the public's general response to the alternatives described in the proposed plan. This criterion will be assessed in the Responsiveness Summary following a review of the public comments received on this proposed plan.

THE PROPOSED PLAN

To protect human health and the environment from contaminated soil, sludge, sediments, and groundwater associated with the Eastern Lagoons and Western Lagoons the MDEQ and the EPA proposes to:

- I. Cap or excavate Eastern Lagoon soil,
- II. Dredge CD #30 sediment,
- III. Deposit contaminated waste into the western lagoons,
- IV. Cap the western lagoon area,
- V. Install a french drain between the waste lagoons and CD #30 to capture contaminated groundwater,
- VI. Pump contaminated water from the french drain to the treatment wetland,
- VII. Construct a treatment wetland to treat contaminated water collected by the french drain,
- VIII. Discharge treated water to CD #30,
- IX. Monitor groundwater and surface water quality to assess the effectiveness of the remedy,
- X. Install permanent warning markers or post signs,
- XI. Fence off the Western Lagoon and wetland area,
- XII. Incorporate restrictions on land use, and
- XIII. Restrict the use of contaminated groundwater .

The Eastern Lagoons and Groundwater - Contaminated soils and sludge in the Eastern Lagoon area would be **excavated** (without treatment) and consolidated into the western lagoons. Contaminated sludge or soil if present beneath the Bronson Plating building, is to remain in place **capped** by the building. The removal and capping of the most contaminated zone of soil in this area eliminates direct contact concerns and reduces the impact of the waste material on the groundwater.

The highest concentrations of contaminants in the eastern lagoon area are generally found in the upper ten feet of soil. The removal of this material combined with the capping of any residual material that may be beneath the building should reduce the concentration of contaminants leaching into the groundwater. This should lower the concentration of contaminants detected in the eastern lagoon groundwater to acceptable levels at the **GSI** for CD #30.

The estimated amount of contaminated sludge and soil to be excavated is 26,000 cubic yards. Under this plan, the excavated material would not be treated. All excavated material would instead be consolidated and buried in the western lagoons. The excavated area would be backfilled with clean soil. Future excavations below ten feet in the removal area or beneath the building would be prohibited unless proper precautions were taken to maintain the integrity of the building, protect workers from potential exposure to contamination, or ensure contaminated soil is properly managed.

After this action groundwater monitoring would be required in the area to evaluate the effectiveness of the remedy.

County Drain #30 - Sediment in CD #30 contaminated above the cleanup goals would be dredged from the drain. Dredged material would then be consolidated with wastes in the western lagoon. A french drain would be installed along the western lagoon area to intercept contaminated groundwater from the western lagoons. This action would prevent the recontamination of sediment in the drain and the release of contaminants from the western lagoon area into the environment. A french drain along the eastern lagoons should not be necessary. Removal of the source material in this area will hopefully lower the concentration of contaminants in the groundwater to a level that is protective of human health and the environment.

The Western Lagoon Area - After consolidating eastern lagoon and CD #30 waste into the western lagoons, the western lagoon area or waste repository would be capped to prevent direct contact exposures and to reduce

the infiltration of rainwater through the waste material. The cap however, does not have to meet MDEQ or RCRA standards for a hazardous waste landfill. Because waste material will remain below the water table, the waste repository uses a pre-existing site (the western lagoons), and the intent of the preferred plan is to contain the waste in place, the plan is not subject to hazardous waste management requirements. Therefore there is no legal or practical advantage in building a landfill cap to meet strict hazardous waste standards. After this action, contaminated waste will remain on-site to a depth of at least 20 feet below the ground. The amount of waste that would remain on site is estimated at 150,000 cubic yards. The waste repository would be fenced off and identified with a permanent marker to prevent any future activities in the area other than maintenance requirements for the remedy.

Groundwater Treatment - Groundwater impacted by the waste material in western lagoon repository would be intercepted by a french drain before entering CD #30. Contaminated water would be pumped from the drain and discharged to a treatment wetland. Contaminated groundwater would flow through the wetland for treatment before being discharged CD #30.

The treatment wetland as a technology was screened in the North Bronson site FS addendum. The treatment wetland appears to be a highly effective although innovative option that promises substantial costs savings over more traditional groundwater treatment options screened in the FS.

Hundreds of treatment wetlands have been built and used to successfully treat surface water discharges containing individual contaminants. However, in this case, the MDEQ and EPA consider the use of a treatment wetland to be an innovative technology. The technology is innovative because of the limited data available about a treatment wetlands ability to remove the large variety of contaminants found in the groundwater at North Bronson. This required the MDEQ and the EPA to make assumptions in developing a site-specific alternative. However, the combination of effectiveness and substantial cost savings for this technology over the other alternatives screened for the site makes a treatment wetland worth developing.

A treatment wetland is a technology that requires land instead of mechanical devices to clean the water. In the FS addendum for North Bronson, the amount of land necessary to meet groundwater treatment goals was estimated at 11.3 acres. This estimate was based on capturing and treating groundwater from both the eastern and western lagoon areas. However, by removing the majority of eastern lagoon waste, treating contaminated eastern lagoon groundwater should not be necessary. By reducing the volume of groundwater requiring treatment the wetland can be made smaller. Current estimates indicate the size of the wetland may be reduced

by 50% or around six acres.

The overall remedy would cost an estimated \$5 million. The plan would take up to 18 months to implement.

The cost of the remedy includes the following elements.

EL-4* Excavating <u>without treatment</u> the eastern lagoon area soil	\$450,000
WL-2 Western Lagoon Area Cap	\$1,000,000
CD-6*	
1. Dredging	\$350,000
2. French Drain (1,500 ft) <u>western lagoon</u> area only.	\$100,000
a. Wetland treatment of intercepted water (six acre Subsurface Flow)	\$650,000
Construction Management(15%)	\$380,000
Subtotal of Construction Costs	\$2,930,000
Engineering(20% ¹)	\$586,000
Permitting(8%)	\$234,400
Contingency(20%)	\$586,000
Total Capital Costs	\$4,300,000
Annual O&M Cost	
1. Monitoring	\$35,000
2. Wetland (includes \$5,000 annual set aside for future replacement)	\$15,000
Total O&M Costs	\$50,000
Five Year Review	\$5,000
Total Present Worth (7% for 30 years)	\$4,900,000

1. *Given the combination of alternatives needed to reach the preferred remedy, a single engineering cost was calculated at 20%.*

This proposed plan would reduce risks to human health and the environment by eliminating or controlling direct contact with contaminants and by preventing contaminants from leaving the site. Except for the complete removal and treatment of contaminated sludge, soil, and sediment, this remedy provides at least as much protection of public health and the environment as any other plan considered in the FS. The cost to remove, treat, and dispose of sludge, soil, and sediment contaminated at levels above the cleanup goals was estimated at \$60 million dollars.

This remedy will result in hazardous substances remaining on-site above health based levels. Therefore, according to requirements in **CERCLA**, a review will be conducted within 5 years after implementing the remedy. This review is to evaluate whether the remedy continues to provide adequate protection of human health and the environment.

Under **Part 201, Environmental Remediation, of the NREPA**, the proposed remedy for the industrial area (the lagoons and groundwater) will meet MDEQ criteria for a limited industrial cleanup. A limited industrial cleanup will require perimeter fencing around the Western Lagoon area, permanent warning markers identifying the location of the buried waste material, and land use restrictions to limit future development in the area to industrial use only. Also, restrictions on groundwater use will be required for the entire North Bronson Industrial Area. The area is currently zoned by the city of Bronson for industrial use only.

The cleanup goals of CD #30 are based on ecological concerns and the MDEQ criteria to protect the residents in the area. Residential standards are higher than industrial clean-up standards and are necessary for CD #30 because public access to the drain cannot be controlled.

COMMUNITY INVOLVEMENT

Public Comment Period - The MDEQ and the EPA will hold a 30 day public comment period on this proposed plan. The comment period extends from August 1, 1997 through August 30, 1997. The purpose of the comment period is to offer the public an opportunity to give the agencies their views on this plan and the other cleanup plans evaluated in the FS. The agencies will not make a final decision until it has reviewed and considered all of the comments it has received. Written comments must be postmarked no later than August

30, 1997. The comments should be sent to William Harmon of the MDEQ or Rosita Clarke-Moreno of the EPA at the addressees below. Based on your comments or new information, the MDEQ and the EPA may considerably modify the preferred alternative or choose another alternative developed in the FS.

Public Meeting - You are also encouraged to attend a public meeting to learn more about the alternatives developed for this site. The meeting will provide you and other interested individuals an opportunity to submit oral or written comments on the RI, the FS, or proposed plan to the MDEQ and the EPA. The meeting will be held on:

Date: August 13, 1997

Time: 7:00 p.m.

Location: The Bronson Theater

Site Updates - The MDEQ will keep the Bronson community informed about new developments by continuing to work with the **Community Advisory Group (CAG)**, preparing articles for the local paper and by mailing updates to individuals on the mailing list. If you would like to become a member of the CAG please contact Dave O'Rourke at:

City of Bronson

141 S. Matteson Street

Bronson, Michigan 49028

(517) 369-7334

SIGNING OF THE ROD

Following the public comment period, the MDEQ and the EPA will evaluate comments received, adjust the remedy where appropriate and sign the ROD for the site. The ROD will detail the remedial action chosen for the site and include our responses to comments received during the public comment period. After the ROD is signed, a design plan for implementing the cleanup plan will be prepared. Once the design is complete, construction of the remedy can begin.

AVAILABLE INFORMATION

Copies of the documents the MDEQ prepared during this investigation and FS of the North Bronson site are

available for review at:

Bronson Public Library
207 North Matteson Street
Bronson, Michigan 49028,
(517) 369-3785.

To obtain further information or to comment on the proposed plan, please contact the following MDEQ or EPA project managers:

William Harmon, Project Manager
MDEQ - ERD
Superfund Section
PO Box 30426
Lansing MI. 48909-7926
Phone: (517) 373-4951
Fax: (517) 335-4887
E-Mail: Harmonw@state.mi.us

or Rosita Clarke-Moreno, Remedial Project Manager
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard SR-6J
Chicago, Illinois 60604
Phone: (312) 886-7251
Fax: (312) 886-4071
E-Mail: Clarke.Rosita@epamail.epa.gov

Mailing List Additions - If you would like to be added to the MDEQ mailing list please fill out the attached form and mail it to William Harmon.

This document fulfills the public participation requirements of **CERCLA** 117(a), which requires the MDEQ and the EPA to publish the proposed plan outlining the preferred alternative and all other alternatives developed in the FS.

GLOSSARY

Applicable or Relevant and Appropriate Requirements (ARARs) - The federal and state requirements that a selected remedy will attain. These requirements may vary between alternatives.

Aquifer- Water bearing soil, rock, rock formations, or group of rock formations.

Capped- Layering with a material, such as clay or a synthetic material used to prevent rainwater from penetrating and spreading contaminated materials. A Resource Conservation and Recovery Act (RCRA) or municipal landfill type cap can substantially limit dermal contact with potential human animal receptors. The cap also minimizes rain water from infiltrating through the contaminated soils and sediments.

MPA (Michigan Public Act) 64 and MPA 641 caps. Hazardous waste landfill caps designed to meet RCRA or state hazardous waste standards. Usually consists of clay layers and synthetic membranes over the waste pile.

Chlorinated organic compounds - A carbon based substance containing one or more chloride atoms.

Community Advisory Group (CAG) - An EPA community relations initiative designed to enhance community involvement in the Superfund process. The group is comprised of concerned citizens to ensure that all segments of the community have an opportunity to participate in the decision-making process at the site. The CAG meets regularly to review and comment on technical documents and plans for the North Bronson Industrial Area Superfund site.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - CERCLA, or more commonly "Superfund", was authorized by Congress in 1980 and established the National Priorities List (NPL), the National Oil and Hazardous Substance Contingency Plan (NCP), and a system of liability for potentially responsible parties and a funding mechanism to remediate or pay for remediation at hazardous waste sites.

Cyanide- A toxic chemical. Any salts or esters of hydrogen cyanide containing a CN group.

Dewater - To remove water from wastes, soils, or chemicals.

1,2 - DCE - 1,2 Dichloroethylene. A chlorinated organic compound. Generally found in the environment as a by-product of TCE as TCE degrades or breaks down naturally.

Excavated - To remove by digging or scooping out.

French drain: A drain system constructed of crushed rock or gravel and sand surrounding perforated pipes, which is used to drain and disperse wastewater.

Hazard Index (HI)- The sum of more than one hazard quotient for multiple substances and/or multiple exposure pathways.

Hazard Quotient (HQ)- The ratio of a single substance exposure level over a specified time period (e.g., subchronic) to a reference dose for that substance derived from a similar exposure period.

Leaching-Dissolving and washing away of a substance by action of a percolating liquid.

Polychlorinated Biphenyls (PCBs)- A class of 209 discrete chemical compounds in which one to ten chlorine atoms are attached to a biphenyl molecule. PCBs are a hazardous substance and probable human carcinogen.

Proposed Plan- A cleanup plan to address the contamination. This plan is presented to the public and they then have a 30 day comment period. These comments can be written or given verbally at public meetings that the EPA or state agency are required to hold. Neither the EPA or the state can select a remedy without evaluating and providing written answers to specific community comments.

Resource Conservation and Recovery Act (RCRA) - RCRA provides the statutory authority for the U.S.EPA to regulate and require the proper management of all hazardous wastes.

Record of Decision (ROD) - An enforceable public document that explains which cleanup alternative will be used at a National Priorities List site and the reasons for choosing the cleanup alternative over other possibilities.

Remedial Investigation/Focused Feasibility Study (RI/FFS) - Two distinct but related studies, normally

conducted together, intended to define the nature and extent of contamination at a site and to evaluate appropriate, site-specific remedies.

Responsiveness Summary- A summary of written or oral comments made by the public on key agency documents and the agency responses to these comments. This document will accompany the Record of Decision.

Slurry wall- A barrier used to contain the flow of contaminated groundwater or subsurface liquids. Slurry walls are constructed by digging a trench around a contaminated area and filling the trench with an impermeable material that prevents water and other liquids from passing through it.

Superfund - The common name for the federal program established by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended in 1986. Superfund is a trust fund to find, investigate, and clean up abandoned or uncontrolled hazardous waste sites.

TCE - Trichloroethylene. A chlorinated organic compound. A stable colorless liquid with a low boiling point. TCE is used as an industrial solvent and as a metal degreasing agent. TCE may be toxic when inhaled, ingested, or through skin contact and can damage vital organs, especially the liver.

Treatment wetland- A wetland constructed for the purpose of treating contaminated water.

Vinyl Chloride - A chlorinated organic compound. A human carcinogen. Generally found in the environment as a by-product of TCE as TCE degrades or breaks down naturally.

Mailing List / Public Comment Return Mailer

If you did not receive this Proposed Plan by mail, you are not on the North Bronson Industrial Area Superfund site mailing list. If you wish to be placed on the mailing list, please print your name and address below, and then fold, tape, stamp, and mail this form to:

Mr. William Harmon

MDEQ-ERD

Superfund Section

PO Box 30426

Lansing, Michigan 48909-7926

Name _____

Address _____

City/State: _____

Zip: _____ Day-Time Phone Number: _____

Representing: _____

Or you may contact Mr. William Harmon of the MDEQ at 517-373-4951

The MDEQ and the EPA want to hear from you regarding the North Bronson Industrial Area Superfund site and the proposed remedial action plan described in this fact sheet. You may use the space below to comment on this proposed plan. You may mail your comments on this form by August 30, 1997 to the MDEQ project manager or attend the public meeting scheduled for August 13, 1997 and present your comments during the meeting. You may also call the project manager at the number provided above.

Table 1

Determination of North Bronson Lagoon Soil, and Sludge Cleanup Goals (ug/kg)

Chemical of Concern	Average Exposure Point Concentration.	Cleanup Goals		Criteria Source Guidance or Reference	
Antimony	600,000	36,000 ¹	7000 ²	MDEQ GSI SWP ¹	Background ²
Arsenic	14,000	23,000 ¹	10,000 ²	MDEQ GSI SWP ¹	Background ²
Barium	2,200,000	410,000 ¹	85,000 ²	MDEQ GSI SWP ¹	Background ²
Cadmium	2,500,000	1200		MDEQ GSI SWP	
Chromium IV	9,000,000	2,200 ¹	190,000 ²	MDEQ GSI SWP	MDEQ Soil Inhalation
Copper	2,500,000	2,900,000 ¹	32,000 ²	MDEQ GSI SWP ¹	Background ²
Lead	1,100,000	400,000		MDEQ Industrial DCV	
Mercury	81	130		Background	
Nickel	38,000,000	59,000 ¹	20,000 ²	MDEQ GSI SWP ¹	Background ²
Selenium	1,000	410		MDEQ GSI SWP	
Silver	28,000	1000		MDEQ GSI SWP	
Vanadium	230,000	130,000 ¹	41,000 ²	MDEQ GSI SWP ¹	Background ²
Zinc	2,600,000	80,000 ¹	72,000 ²	MDEQ GSI SWP ¹	Background ²
Cyanide	2,600,000	390		Background	

¹ Clean-up goal protective of surface water.

² Clean-up goal protective of surface soil runoff of direct contact or inhalation concerns.

GSI Groundwater/Surface water interface

SWP Soil Water Partion Coefficient

Table 2

Determination of North Bronson County Drain #30 Sediment Cleanup Goals (ug/kg)

Chemical of Concern	Exposure Point Concentration.	Cleanup Goal	Criteria Source Reference or Guidance
Antimony	5,000	2,000	NOAA Exposure Risk-Low
Arsenic	23,000	5,500	Part 201 Residential DCV
Barium	230,000	10,000	Background
Cadmium	200,000	5,000	NOAA Exposure Risk-Low
Total Chrom	1,900,000	80,000	NOAA Exposure Risk-Low
Copper	4,500,000	70,000	NOAA Exposure Risk-Low
Lead	510,000	35,000	NOAA Exposure Risk-Low
Manganese	330,000	97,000	Background
Mercury	130	200	Ontario Lowest Effect Level
Nickel	1,200,000	30,000	NOAA Exposure Risk-Low
Silver	7,500	1,000	NOAA Exposure Risk-Low
Vanadium	30,000	5,400	Background
Zinc	770,000	120,000	Ontario Lowest Effect Level
Cyanide	9,400	100	Ontario Lowest Effect Level
PAH(total)	15,000	4,000	Ontario Lowest Effect Level

NOAA National Oceanic and Atmospheric Administration

Table 3

Determination of North Bronson Lagoon Area Groundwater Cleanup Goals (ug/L)

Chemical of Concern	Exposure Point Concentration	Cleanup Goal	Criteria Source Reference or Guidance
Cadmium	111	5	MDEQ Industrial Drinking Water Values
Lead	3	4	MDEQ Industrial Drinking Water Values
Mercury	0.15	0.6	Background
Nickel	550	564(a)	MDEQ GSI Mixing Zone
Silver	2	3.6	MDEQ GSI Mixing Zone
Zinc	5,000	980	MDEQ GSI Mixing Zone
Cyanide	100	19	MDEQ GSI Mixing Zone
Nitrate+Nitrite	400,000	10,000	MDEQ Industrial Drinking Water Values
Trichloroethylene	450	300(a)	MDEQ GSI Mixing Zone
1,2 DCE	600	900(a)	MDEQ GSI Mixing Zone
Vinyl Chloride	60	11(a)	MDEQ GSI Mixing Zone

GSI Groundwater/Surface water Interface

1,2 DCE 1,2 Dichloroethylene

a. GSI clean-up goal exceeds MDEQ Drinking water criterion or Maximum Contaminant Levels for drinking water.

Table 4
Comparative Analysis of Clean-up Alternatives - County Drain #30

Alternatives	Protection of Public Health & Environment	Total Cost	Implementability	Reduction of Toxicity, Mobility, and Volume	Compliance with Federal & State Regulations	State & Community Acceptance	Long-Term Effectiveness	Short-Term Effectiveness
CD-1 No Action	Minimal or no protection.	\$473,600	Easily implemented. Requires long-term management & 5 yr. reviews.	No reduction in toxicity, mobility, or volume of sediment contaminants.	There are no location or action specific ARARs.	Will be evaluated after public comment period.	Ineffective. No feasible future use, area would be considered harmful.	Ineffective.
CD-2 Access Restrictions & Monitoring	Reduces direct contact. Provides some protection.	\$748,300	Readily implemented. Requires long-term management & 5 yr. reviews.	No reduction in toxicity, mobility, or volume of sediment contaminants.	There are no location or action specific ARARs.	Will be evaluated after public comment period.	No protection except health advisories, will increase public awareness.	No protection except health advisories, will increase public awareness.
CD-3 Partial Sediment Dredging	Provides some protection. Reduces direct contact.	\$995,200	Readily implemented. Requires long-term management & 5 yr. reviews.	Some reduction in volume of contaminants. No reduction of toxicity or mobility.	Will comply with location or action specific ARARs.	Will be evaluated after public comment period.	Reduces contaminant volume, but need other contaminant source controls upstream.	Health advisories only. Increased public awareness.
CD-4 Full Sediment Dredging	Provides protection. Reduces direct contact.	\$2,580,000	Readily implemented. Requires long-term management & 5 yr. reviews.	Provides for reduction in toxicity, mobility, or volume of sediment contaminants.	Will comply with location or action specific ARARs.	Will be evaluated after public comment period.	Reduces contaminant volume, but need other contaminant source controls upstream.	Health advisories only. Increased public awareness.
CD-5 Sediment Dredging with channeling	No protection to human health and the environment.	\$2,779,000	Readily implemented. Requires long-term management & 5 yr. reviews.	Provides for reduction in toxicity, mobility, or volume of sediment contaminants.	Will comply with location or action specific ARARs.	Will be evaluated after public comment period.	Reduces contaminant volume, but need other contaminant source controls upstream.	Health advisories only. Increased public awareness.
CD-6 Sediment dredging & French Drain along selected areas	Provides protection to human health and the environment.	\$4,129,000	Readily implemented. Requires long-term management & 5 yr. reviews.	Provides for reduction in toxicity, mobility, or volume of sediment contaminants.	Will comply with location or action specific ARARs.	Will be evaluated after public comment period.	Reduces contaminant volume, but need other contaminant source controls upstream.	Health advisories only. Increased public awareness.
CD-7 Sediment dredging and French Drain	Provides protection to human health and the environment.	\$8,848,000	Readily implemented. Requires long term management & 5 yr. reviews.	Provides for reduction in toxicity, mobility, or volume of sediment contaminants.	Will comply with location or action specific ARARs.	Will be evaluated after public comment period.	Reduces contaminant volume, but need other contaminant source controls upstream.	Health advisories only. Increased public awareness.